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GERMINATIVE CAPACITY OF ENGELMANN SPRUCE SEED

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During the last 3 years 17 lots of Engelmann spruce seed from eight national forests in the Intermountain region were tested for germinative capacity. The results reported here are an interim contribution to an organized collection of silvical facts designed to provide a means of better management of Intermountain forest types. Knowledge of the germinative capacity of forest seed is useful in both artificial and natural regeneration activities. To the writer's knowledge no published results of tests of Engelmann spruce seed from the Intermountain region are available.

All seed was collected from mature and overmature trees either standing or felled in sale areas except lots Boise "3" and Targhee "1" (table 1), which came from immature trees. The Manti-LaSal lot was taken from a squirrel cache.

Except for the lot from the Manti-LaSal National Forest, all seed to be tested was stored in sealed containers at 36° F. from October to March. Germination tests were made on moistened blotting paper in covered petri dishes. Uncontrolled room temperatures varied between extremes of 63° and 82° F., but mostly were between 66° and 78° F. In 1957, 11 lots (1956 seed) were stratified in moist sphagnum at 36° F. for 5 weeks and their germination compared with seed from the same lots of unstratified seed. The results of these tests are set forth in table 1.

Table 1.--Germinative capacity of Engelmann spruce seed

National forest	Seed lot	Seed year	Basis	Approximate elevation	Germinative capacity	
					Unstratified	Stratified
				Feet	Percent	Percent
Boise	1	1956	400	7,000	73.2	56.7
	2	1956	400	8,000	63.5	59.7
	3	1956	400	7,300	43.0	52.2
Bridger	1	1956	400	9,000	63.5	71.2
	2	1956	400	9,000	52.7	80.2
Dixie	1	1955	500	10,000	59.0	--
	2	1955	500	9,000	58.2	--
Fishlake	1	1955	500	10,200	45.2	--
	2	1955	500	10,200	7.4	--
Manti-LaSal[1/]	1	1955	400	9,600	94.0	--
Payette	1	1956	400	6,600	67.0	63.0
Targhee	1	1956	400	8,000	47.7	50.7
	2	1956	400	8,000	59.5	66.7
	3	1956	400	8,000	60.5	52.7
Uinta	1	1956	400	8,500	61.7	64.2
	2	1956	400	8,500	70.5	74.2
	1	1957	400	9,800	58.2	--

[1/] Tested by A. Perry Plummer, Great Basin Research Center, Ephraim, Utah.

Stratification produced a slightly higher average of viability--62.9 percent for the stratified seed as against 60.5 percent for the unstratified--but also produced a much greater difference in germinative energy. After 8 days, 93.3 percent of total germination had occurred in the stratified lot and only 60.1 percent for the unstratified. After 13 days, corresponding figures were 98.7 and 93.1. Longest time for culmination of germinative capacity was 62 days. Some of the 1955 seed from the Fishlake and Dixie National Forests had been infested with unidentifiable insects which lowered viability values slightly.

Optimum conditions for a schedule of testing seed of this species are unknown. Wide variation is known to exist in the germinative capacity of Engelmann spruce seed depending on the conditions of incubation.1/ While the majority of values are between 50 and 70 percent, the data in table 1 must be considered approximate because of the many factors such as collection dates and processes of handling that could produce variation in germinative capacity. They probably represent, nevertheless, with the possible exception of the Manti-LaSal and Fishlake "2" values, what can be expected under average conditions for natural regeneration and nursery sowing.

1/ Heit, C. E., and E. J. Eliason. Coniferous tree seed testing and factors affecting germination and seed quality. New York State Agr. Expt. Sta. Tech. Bul. 255. 1940

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